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THE SCIENTIFIC SPIRIT

IF you read the papers, you probably noticed, last month, that Dr. Richard Goldschmidt of the University of California has announced the discovery of a magic substance, heterochromatin, existing in the cells of all living things, which, he says, may be responsible for evolutionary transformations such as the origin of a new species. After three years of studying heterochromatin in fruit flies and worms, Dr. Goldschmidt reports that "it can cause a leg to grow on a fruit fly in the place where a wing should be."

Heterochromatin was first identified twenty years ago, but was then regarded as playing no part in genetic activity. Dr. Goldschmidt, however, told the National Academy of Sciences that this substance stimulates the growth and development of cells in a certain direction, and then disappears, like an architect called to another job, leaving other processes to complete the structure. He believes that heterochromatin may cause great evolutionary changes to occur suddenly, instead of over long periods of time, as Darwin thought.

Not being biologists, we can hardly comment on this discovery from a technical viewpoint. But we do know that Dr. Goldschmidt is a respected member of the scientific fraternity; that for years he headed the Kaiser Wilhelm Institute in Berlin, where he first published, in 1927, his physiological theory of inheritance, making the process largely dependent upon chemical reactions in gene-substance; that in 1937, at the University of California, he declared that the "genes" are fictions and theoretically unnecessary, having come to regard the chromosomes as the units of hereditary transmission. Since then he has been credited by distinguished colleagues with having offered "the only basically new theory of organic transformation propounded during the current century"—the theory of sudden changes which he calls Macroevolution.

Macroevolution [he says, in the *Material Basis of Evolution*, published in 1940] may proceed by large and sudden steps which accomplish at once what small accumulations cannot perfect in eons, and this on the specific as well as on any higher level. . . . Species and the higher categories originate in single macroevolutionary steps as completely new genetic systems.

The interesting thing about this theory, independent of its experimental basis, is its return to the pre-Darwinian philosophy of origins. Biologists and geologists be-

fore Darwin held that "sudden" changes in the past were quite acceptable—even necessary—to scientific theories, in order to preserve some kind of harmony with Christian revelation. After all, God created the whole world in six days, which is pretty sudden. Early in the nineteenth century, a scientist who didn't build his explanation of the natural world in a way that would accommodate Genesis was liable to be marked for an unbeliever—as both Lyell and Darwin were, in the course of time. So, in the fields of Geology and Biology, the battle of orthodoxy was fought out between the Evolutionists, represented by Scrope, Lyell, Darwin and Huxley, and the Catastrophists, as the believers in sudden change were called, represented by the earlier Cuvier, Buckland, and others now forgotten. (See Judd's *The Coming of Evolution* for an account of this controversy.)

Dr. Goldschmidt is a twentieth-century Catastrophist. This is not just our own idea of his theory, but was suggested by a reviewer in *Science* for Oct. 18, 1940, who discussed Dr. Goldschmidt's book under the title of "Catastrophism versus Evolutionism." Although the reviewer says that Goldschmidt rejects any idea of evolution which goes "beyond the narrow confines in which it had been admitted to exist by Linnaeus and many creationists," and to present ideas which "are related to those of G. St. Hilaire rather than to those of any modern evolutionist," there is of course a great difference between his philosophical assumptions and the beliefs of the creationists. Dr. Goldschmidt has broken with the Darwinian tradition almost completely, not because of any loyalty to God, but because of his confidence in the extraordinary processes of organic chemistry. Not God, but Heterochromatin, is the wonder-worker in his theory of organic transformation.

There were two great reasons why most of the geologists and the biologists of Darwin's time were Catastrophists, and bitterly opposed to any gradualist doctrine involving the slow and continuous appearance of new species. The first reason was the Biblical idea of a creation accomplished in six days; the second was the effect of Archbishop Usher's chronology, which fixed the hour of Creation at 4004 B.C.—a date obviously prejudicial to all theories of geologic time.

It was evident to both Lyell and Darwin that there could be no really scientific history of the world unless

Letter from GERMANY

GIESSEN.—In the October issue of *Amerikanische Rundschau* (a monthly publication of U.S. Military Government for Germany), Dorothy Thompson addressed an open letter, "To my German Friends." Dorothy Thompson has lots of friends in Germany—for she knew how to make them. The writer of these lines, for instance, knows from personal experience that her courageous and consistent opposition to the Morgenthau Plan met with great approval and even admiration among German prisoners of war in the U.S.A.

Her letter in *Amerikanische Rundschau* also gives evidence of a sincere desire to interpret Germany's and Europe's situation rightly, and to find a way out of the existing chaos. Nonetheless, her conclusions cannot be accepted without debate, inasmuch as she sheds a false

the dogma of creation could be made to give way to impersonal principles of development. A world half produced by miracle, and half by "natural" processes, would be a world beyond the comprehension of serious science. Thomas Huxley summed up the position of the evolutionists as founded on "a great principle and a great fact"—

the principle, that the past must be explained by the present, unless good cause can be shown to the contrary; and the fact, that, so far as our knowledge of the past history of life on our globe goes, no such cause can be shown—I cannot but believe that Lyell, for others, as for myself, was the chief agent in smoothing the road for Darwin. For consistent uniformitarianism postulates evolution as much in the organic as in the inorganic world.

The evolutionists, in other words, were determined to base their explanation of the natural world upon forces which the human mind can understand. They sought for causes amenable to study by the scientific method, and they intended to hold to this position unless forced into some other by demonstrable facts. They didn't like the idea that God "can do anything." That is why the evolutionists of the last century were "Uniformitarians" instead of "Catastrophists." It seemed to them that the doctrines of the Catastrophists made rational science impossible.

The thing we want to establish, here, is that modern evolutionary science began under the impetus of a moral idea—the idea that man is capable of learning the truth about nature, and that theories which would make that knowledge virtually impossible for him are to be regarded with disfavor.

Returning to Dr. Goldschmidt's report to the National Academy of Sciences, it appears that the progress of biological investigation has finally led to a revival of Catastrophism, which means, in practical terms, that the processes of evolution must again be regarded as inexplicable or "irrational." Of course, it was not Dr. Goldschmidt's intent to point to any such conclusion. As a scientist, he is looking for the "true" cause of organic

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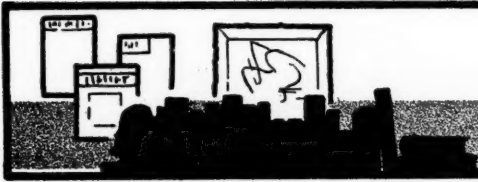
light upon two great problems such as National-Socialism and German militarism. Miss Thompson criticizes German denazification procedures "for the reason that they do not pay any attention to the idea of amnesty," at a time when the weak anti-Fascist forces in Germany are observing with apprehension the emergence of another brand of Neo-Fascism. As a matter of fact, 1.9 out of 3.3 millions of politically organized Nazis were immediately amnestied in the U.S. Zone upon the promulgation of the Law for Political Liberation. Minor sanctions were imposed upon others, who were prevented for a very short time from playing their roles in public political affairs. Actually, 32.5% of former Nazis were reinstated again in lower, and 50.6% in higher, civil service positions of Greater Hesse, as early as December, 1947.

Miss Thompson wants to see punished only those persons who can be convicted of positive crimes. Well, what are "positive crimes"? True enough, one has to hold the fanatical and younger members of the SS and SA mainly responsible for killing and mistreating millions of Jews and political opponents. But are they the only ones supposed to be guilty of such brutalities? How about university professors who invented a pseudo-scientific basis for the anti-Semitism, and the actors and authors who gave such ideas wider currency? Nazi brutalities were also dependent upon an extraordinary organizational structure; for it was beyond the power of only a few thousand people to kill off 11 millions of human beings and transform Europe into a huge penitentiary. Such results could be attained only by organized political activity embarked upon by more than a hundred thousand people—people who knew that such enormous "positive crimes" were possible only through their active participation.

Miss Thompson is also against "treating officers as war criminals simply because they would stand beyond the sphere of politics everywhere by virtue of their profession and have to unconditionally obey their respective governments." According to that opinion, the generals sentenced at Nürnberg to long prison terms did not get a fair trial, as it is well known that they all can claim to have received their orders from their government. General Beck, former General Chief of Staff, who voluntarily resigned from his position when he realized the criminal nature of Hitler's methods, is a typical example of how high-ranking professional officers could choose a politically responsible course of action. When Jewish places of worship were set on fire, property owned by Jewish citizens destroyed, and Jewish people deprived of their freedom while being subjected to exquisite cruelties—things that happened simultaneously in November, 1938—every officer was bound to know that he was rendering service to a depraved movement.

Conceding to such officers that they did nothing else but properly discharge their duties by obeying their government is tantamount to confirming the opinion that the plotters of July 20, 1944, who tried to overthrow the Hitler regime, were traitors to their country.

Meanwhile, the General Staff officers sentenced to long prison terms these days in Nürnberg—officers who



REVIEW

OF MEN AND SYSTEMS

THE HEART OF THE MATTER by Graham Greene, and *Nobody's Fool* by Charles Yale Harrison, are both books about men in relation to systems. Mr. Greene, a Catholic novelist, writes about a middle-aged Englishman so completely caught in his beliefs—and other things—that he can only commit suicide to escape, although his death means something more than just an escape. *Nobody's Fool* will inevitably be compared with Frederick Wake-man's *Hucksters*. It is another satire on and protest against the elite rotarianism of advertising and publicity men—the professional sophists of the twentieth century.

We have selected these books for review not because they are especially important to read, but because they deal with the struggles of individuals within systems. A large part of modern life is involved in conflicts, sometimes conscious, sometimes not, with systems. We take the view that systems are or ought to be made for man, not man for systems. Maybe they ought not to be made at all. In both of these books, the system devours the man. It happens in different ways, and there is nothing in either book to explain how systems get so much power over human life. This last is probably the most important question of all—having to do with what has been called "the responsibility of peoples." But here we shall deal only with the way in which these systems operate to frustrate and drive to drink and ruin most of the people who are caught in them. Mr. Harrison's clever volume—a bit too clever in spots—offers no material for deep reflection, but it does show the sort of people who have sold out their ideals in order to make money—lots of it. The ex-poets, ex-radicals and ex-liberals who "do publicity" know what they are doing and hate themselves for it, in sober moments. Mr. Greene is a man who be-

did not revolt against Hitler—are supposed to be national martyrs. For, as everyone knows, the accused in Nürnberg keep referring to that allegiance which Dorothy Thompson concedes to them. But why should not even soldiers be under a moral obligation to disobey a pyromaniac and terroristic government? Why should they not be expected to decide, as human beings, when their government can no longer be considered an honorable one, but a government over-stepping the bounds of civilization?

It seems strange to us to find so courageous and experienced a champion of democracy and progress as Miss Thompson warmly defending the cause of German reaction—a cause which has never been accorded too severe, but only too lenient a treatment by its judges—with mankind, as usual, the loser.

GERMAN CORRESPONDENT

lieves that you have to submit to the system, letting mysteries remain mysteries, and trusting to God. Mr. Harrison opposes to the system a kind of copy-book liberalism not half so well worked out as the cynical sagacity of his manipulators of public opinion. *Nobody's Fool* is probably more fun for an evening's reading, while *The Heart of the Matter*, concerned with ultimates in the psychology of religion, is more gripping and should be more instructive, and so we devote our space to this book.

Mr. Greene's Major Scobie is a veteran, fifty-year-old Commissioner of Police of a coastal town in an African British colony. He has a petulant, inferiority-ridden wife in her forties, whom he tries to cheer up as best he can. He is a British civil servant, a man of integrity and infinite patience with the native blacks. He has the trust of his superiors, but is passed over in a promotion which means something to him, and much more to his wife, who feels that she can no longer "face" their friends, now that this opportunity for higher social status has been lost.

Scobie does his best, but the system is too much for him. First, he borrows money from a Syrian trader in order to send his wife on a needed vacation. It is not exactly wrong, but very bad policy, for him to borrow from a Syrian suspected of smuggling diamonds. Scobie is progressively "betrayed" by his sympathy for other human beings into sinning on a larger and larger scale. While his wife is gone, he tries to comfort a shipwrecked widow, and finds himself in love with her—an adulterous love. The Syrian finds him out and forces Scobie to act as an intermediary in a smuggling operation. Then Scobie tells the Syrian he cannot trust his houseboy any more—who has been with the Commissioner for fifteen years. The Syrian has the houseboy murdered, and Scobie is aghast. He loved the houseboy. Meanwhile Scobie's wife returns and asks him to go to Communion with her. It is a mortal sin for Catholics to take communion without first confessing their sins and having absolution from a priest. But Scobie is unable to hurt the shipwrecked widow by renouncing her, and so he cannot have absolution, although he confesses to a priest. Then, to spare his wife, he accepts Communion, and lives in stoical acceptance of eternal damnation. In each case, he has acted out of sympathy, and each act raised the scale of his sins to a higher power. Finally, he determines that the suffering he has caused to others can only be relieved by his death. He carefully plans a suicide that will be diagnosed as angina pectoris—so that his wife will have the insurance money—and carries it out.

These are the bare bones of the story. Mr. Greene's tortured moral is that Scobie was a sinner—and therefore a "normal"—Christian, but that he preferred eter-

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"IT NEVER OCCURRED TO HIM"

THE German Letter for this week reminds us of an article by Hans Richter which appeared in the *Christian Century* during the war (July 16, 1944). Richter wrote of a young friend called "Harro," a high-minded student who once thought Hitler would do good for Germany. But at the outbreak of the war, he saw more clearly. As a lieutenant in the *Luftwaffe*, he wrote to his father:

"We are going to fight—for what? If Hitler wins, our Christian faith is dead. If he is defeated, universal pessimism will break us all. What do we fight for?"

Richter, finishing the story of Harro, continues:

But as a good German, trained in the tradition of Kant and Hegel, Harro did his duty; it never occurred to him to disobey the state. He had found that the Hitler regime involved the destruction of precisely those values he had finally come to cherish—but he felt it his duty to fight for his fatherland. Now Harro has died. With him the hope of a better Germany has faded a bit. He was just an ordinary student—but there are tens of thousands like him.

Not all of those tens of thousands were killed. Some are among the soldiers and officers spoken of by our German Correspondent. Caught in the military machine, "it never occurred to them," either, to reject the authority of the State. They acted with mechanical obedience, filled with inward despair.

But how, in selecting the guilty Germans, do you distinguish between officers and men who obeyed orders with inward despair, and those who obeyed with inward enthusiasm?

It should be evident that the "justice" that deals in punishment must be a cruel and indiscriminating thing, operating by rule of thumb and with ruthless fallibility.

Our correspondent implies that Germans in authority ought to have resisted the Nazi State. Some did, he points out. But why should resistance be required only of Germans "in authority," and not of others—all others?

We could not quarrel with this view. But before insisting upon it, we should have to be certain that we, ourselves, have always resisted evil practiced in the name of good. If it did not occur to them to resist, would it occur to us?

The high standard of personal behavior proposed by our correspondent is, we think, a standard all men ought to apply, but to themselves—for who has the right to punish for what is, or is not, in another man's heart?

REVIEW—(Continued)

nal damnation to causing pain to others. Whether the author intends it or not, Scobie attains the stature of a more-than-ordinary saint, although he commits the worst crimes on the Catholic calendar, dying at his own hand while in mortal sin.

Mr. Greene has been roughly handled by some critics for this story. They say that Scobie is an inconsistent character and "unreal." We do not share this impression. We find Scobie believable and curiously admirable—which is our tribute to Mr. Greene as an artist. In other words, we understand, we think, the kind of constraint the Catholic system of belief imposed upon Scobie, and honor him for his fight, continued without surrender, against forces that were too much for him.

Scobie really broke with system in nearly everything he did, once the coil of circumstance and conscience began to tighten. He was all mixed up, but he stayed by his principle of trying not to hurt any other human being, even though he expected to burn forever in Hell for doing so. The Catholic system binds with fear. Scobie accepted the worst his system could threaten him with and went on doing what he had to do. He found his freedom the hard way. A book like this makes us wonder how good a Catholic Mr. Greene can be.

The integrity of this story, of course, ought not to be taken for an argument that determined adultery, civic corruption and suicide are unimportant, so long as one's heart is pure. It is only that the book is a convincing picture of the upside-down world in which Scobie lived—a world where the course he followed seemed better than the "right" or "moral" things to do, according to his religion. Scobie was not a small or petty man, but he believed in a religion constructed for petty sinners. That, we think, is why he got all mixed up. He couldn't match up the rules of the system with the facts of life, and so he went by his feelings and the facts, and took the penalty for breaking the rules like a man. Scobie could not imagine that there might be other and better rules to go by—the rules, for example, that forced Mr. Greene to write about Scobie in a way that shows he thought more of him than anyone else in the book, and wanted his readers to feel the same admiration.

MANAS is a journal of independent inquiry, concerned with study of the principles which move world society on its present course, and with search for contrasting principles—that may be capable of supporting intelligent idealism under the conditions of life in the twentieth century. MANAS is concerned, therefore, with philosophy and with practical psychology, in as direct and simple a manner as its editors and contributors can write. The word "MANAS" comes from a common root suggesting "man" or "the thinker." Editorial articles are unsigned, since MANAS wishes to present ideas and viewpoints, not personalities.

The Publishers

CHILDREN ... and Ourselves

SPEAKING of "Children—and Ourselves" for Nov. 3, which advocated elimination of formal religious distinctions from the public schools, a reader objects to our argument. He feels that the God-idea is essential to Democracy, and criticizes the column, as follows:

It assumes democracy is a unity, a group of ideas existing by themselves, the "logos" of Christian thought. This is not true. There has been no such thing as democracy in history, except in the Judeo-Christian tradition. Greece was never a democracy in an acceptable modern sense. Democracy is a sterile thing, as in Greece, unless based not only on brotherhood, but on *equality before God*. No substitute for this thought-process has yet been found.

It is not difficult to understand why those who make the articles of Christian faith a repository for their own idealisms feel, sooner or later, that their idealisms depend upon the articles of faith. This is particularly evident when any "Christian" rejects the suggestion that our civilization might have been able to get along as well—or better—without God. All too often, it seems to us, however, well-meaning God-believers assume that there are only two classes of people—those who are without any concept of spiritual values and those who, like themselves, insist on the existence of a Supreme Personal Being. While this either-or tendency may be explained by the fact that many "irreligious" men are insufficient in moral quality, it cannot be *excused* on this basis, for such is not always the case. We think it would be very difficult to accuse Albert Einstein of being amoral, or immoral, or lacking in "spiritual values," and yet Einstein once publicly declared that belief in a personal God is a serious handicap in ridding ourselves of intolerance. He said:

In their struggle for the ethical good, teachers of religion must have the stature to give up the doctrine of a personal God—that is, give up that source of fear and hope which in the past placed such vast power in the hands of priests. In their labors they will have to avail themselves of those forces which are capable of cultivating the Good, the True and the Beautiful in Humanity itself. That is, to be sure, a more difficult but an incomparably more worthy task.

Obviously, the point raised by our subscriber calls for serious reflection. It is very important to know whether our children must be told that God exists in order to sustain a belief in spiritual equality in their future dealings with society. While so far-reaching a question cannot be finally settled, here, a few lines of departure may be offered.

In the first place, it is obvious that any argument which, like that of our subscriber, contends for the social necessity of God, finds the supreme value, not in God, but in an attitude of respect toward the spiritual importance of all human beings. We share with our critic the feeling that it is desirable for men to have good reason for differentiating themselves from those who feel that the supreme values of human living are purely

sensory or materialistic. But belief in God is not crucial to this distinction.

What is the "God-Idea," in itself, and what effect does it have upon the minds of the young? Regardless of what theological sophistication one may eventually acquire, God is usually a fear-object to the young. He created us, and our destiny is in his hands. God can do for us things we cannot do entirely by ourselves, and therefore through his mediation, we may obtain many things we wish through supplication. God, in the child-mind, therefore, becomes a dispenser of privilege, and it is an inevitable psychological fact that we tend to fear, even if only subconsciously, all those agencies which we regard as dispensers of privilege. If our only conception of equality were actually that of equality before God, we submit that we should have only the equality of slaves in the presence of a just master. But the conception of human equality which has been responsible for the major share of human progress toward brotherhood is considerably more involved, resting more on a humanistic foundation than on a theological one. When Eugene Debs said, "If there is a criminal class, I am of it," he meant that all the burdens of the world were *his* burdens, and that he conceived it necessary for him to expend his energy to change the conditions which make for social inequality. It was not important to Debs, nor has it been to any other inspired reformer, that man might be "equal before God." It was supremely important to him that men were not yet held to be equal in the eyes of their fellowmen.

We do not assert that man is primarily spiritual—that is, partaking of an indestructible moral potential—simply by stating that God regards all human souls compassionately. If our God-belief is integral with a sense of human spiritual dignity, and results in actions commensurate with a philosophy of the brotherhood of man, it might be said that we are acting, in such instances, *as* spiritual beings. There can be no quarrel with those who use the God-idea as their private reminder that only moral or spiritual goals are important. But when it is insisted that all spiritual striving must be linked to a belief in God—and that the God-idea, therefore, should be made dominant in the lives of our children, through propaganda and indoctrination—we feel that a true religious prerogative has been exceeded. God may be good for some people, but he obviously is very bad for others. Certain events of the Middle Ages represented notable antitheses of any philosophy which proclaims individual man's spiritual dignity or "equality."

It is further apparent that humanitarian social efforts and equalitarian political movements have often democratized the God-idea. We cannot argue convincingly before the bar of History that the God-idea has inspired the idea of equality. Rousseau, Voltaire, Diderot and Thomas Paine did *not* avow belief in the Christian Deity. As more than one author has suggested, conceptions of God proceed apace with man's intellectual development,—and, in most instances, the greater the social benefit of that development, the further away from the idea of a Personal Being has the concept of Deity travelled.



RELIGION

SCIENCE

EDUCATION

FRONTIERS

Let Us Be Reasonable

REFLECTING the usual reliance of modern man upon "big" organizations, the San Francisco *Chronicle* last month (Nov. 9) came out editorially for a supreme governmental effort to gather all the facts and figures that will be necessary to produce "a reasonable man." Look at the Manhattan Project, which produced the atom bomb. Why not study man with the same intensity and on the same scale? Two billion dollars and scientific and engineering and industrial talent were combined to produce the "impossible"—the Bomb—and surely, with a similar program, we ought to get the same wonderful results in the production of Man.

The idea is journalistically plausible and it made an editorial with that upward-and-onward spirit so dear to the writers, if not the readers, of the American press. The *Chronicle* said:

We propose that the United States Government set out, under a One-Triple-A priority, to explore the genus man to discover those things that can be done as a nation to make him a responsible citizen of the world. We are confident that it can be done. . . .

You say it can't be done? We say the time is approaching when it must. We say the time is at hand when this nation, to save itself and its way of life, must organize the mighty energies in the project of waging the peace that it devoted to waging war.

What we're proposing here is a beginning at such an organized effort, in a specific field. We believe it may well prove to be the central field in which the campaign is to be waged. We are suggesting, for this phase, the expenditure of as much energy for the improvement of man and the furtherance of society's progress as was expended, in the Manhattan project, for the destruction of man in the effort to hold society back from the edge of the precipice. . . .

How will the two billion be spent? The nation is invited to endow "a tremendous university" where will be gathered and coordinated *all* that is known concerning human reactions—"all the data mankind has thus far laboriously amassed on the subject of himself." Here will congregate the best in historians, physicians, psychologists, psychiatrists, the clergy, geographers, meteorologists and nutritionists, to sift the evidence, synthesize the facts, and to come out, in the end—in "the very long run"—with

a new kind of parent, a new kind of teacher, and a new kind of citizen—a citizen with a firm intellectual grasp of his responsibilities, and the motivation to discharge them. . . .

It must be apparent to all that the progressive increase in the arms budget is not the whole, the final, answer. The final answer must be the creature we are seeking here—a rational, reasonable man.

We say that \$2,000,000,000 is a cheap price for such a creature. . . .

After a few moments of silence and inward searching,

we are brought to agree with some of the *Chronicle* editorial. A bigger arms budget it not "the whole, the final answer."

But we have never heard of any rational, reasonable men who could be bought or built for \$2,000,000,000. And we don't think you need to assemble a "tremendous university" to recognize the fact that the bigger the universities, the littler the men they are liable to produce.

A big university likes to think of man as a "creature," the same as the *Chronicle* editorial. But a real man is not a "creature"—least of all would a rational, reasonable man be a creature. Instead, he would be a creative being with a mind of his own.

The *Chronicle* has been printing written responses to its proposals, but none of them has been especially interesting. In a way, we had been hoping that some *Chronicle* reader with a brighter view of the proposal than ours would contribute a few constructive suggestions, or extensions of the thinking it contains. It seems only fair to admit that honest enthusiasm for more knowledge about man—if the *Chronicle* could stir it up—would be a good thing, even on a "tremendous-university" basis. Such comment, however, has not been forthcoming. Meanwhile, we print the following comments on the critical side, sent to us by a MANAS subscriber who has given the implications of the proposal considerable thought:

"Essentially, you propose that the problem be solved by the same means and the same kind of men that created the atom bomb. You reason that, being capable of 'miracles' like the bomb, we should be capable of moral 'miracles,' too. This does not follow. In serious research, if a worker with a given set of tools fails, in a reasonable period, to produce at least a promising approach to the problem he is working on, it is customary to try someone else with some other tools.

"The tools which have had a tryout so far in the Occident are Science and the Judeo-Christian religion, as they exist today. The latter has been tried for 4,000 years as Judaism and for 2,000 years as Christianity, and the former has been operating for about a century. Under Science, however, we have been getting into trouble faster than at any previous time in history. There is no sign that any of the attitudes and techniques which produced the automobile, the airplane and the atom bomb will ever produce more reasonable men, in the sense you mean. These techniques give men power; they do not make them better. The net result is increased danger, because personally ambitious men, unscrupulous men, men suffering from inferiority complexes, are the men most attracted to the use of the new instruments of power.

"If scientific methods as now understood tended toward producing men more reasonable than the current species, we might expect scientists to show significant differences from the 'common man' in that regard. But such significant differences are not especially evident.

"Psychiatry—which is hardly a science, yet—may be considered more promising, but is of questionable value for our purpose. It tries to produce 'well-adjusted' people, which is not necessarily what we want, because that means people who are emotionally in line with what goes on around them. Mohandas K. Gandhi, conceivably, could be branded as having had many of the 'complexes' in the psychiatric lexicon. Would it have been an addition to the world's reasonableness to have removed them and made of him a contented conformer?

"I find myself drawn to examine what has been done in the way of producing reasonable men in the past, and the means by which they are produced. If we say 'reasonable men' are those who tried on principle to get along with other people, the best examples we can find are men like Buddha, Lao Tze, Socrates, Plato, Christ, and this same Gandhi and a few others, among whom we should probably include Lincoln. These men, or most of them, carried the idea of getting along with other people about as far as it can be carried. Most of them would rather have died than kill anybody for their own personal self-preservation, and to starve rather than cheat or conquer.

"You may say that this is being unreasonably reasonable—that we want men who will be reasonable in moderation. But where will you draw the line? If reasonableness means getting along with only the people who will be reasonable with *us*, it looks to me as though that is just what we have now. From the viewpoint of the contemporary majority, one is justified in trying to get along with others only so long as it involves no really painful sacrifice. I fear the present-day situation proves that this won't work much longer—is not, in fact, working now.

"In view of the maldistribution of the world's resources and their rapid exhaustion through waste and war, and in view of the present rate of increase in population, it is fairly clear that we cannot have world peace except among men who are willing, without rancor, to undergo at times very severe hardship while others are living in comparative comfort; and who are balanced, on the other side, by men who are willing to give up much of their own comfort in order that others may have merely enough to eat. I cannot see such men anywhere, short of a handful of sincere imitators of the above-named personages.

"Suppose we open our minds to the possibility that the Christ-Buddha-Socrates-Lincoln-Gandhi kind of man is the reasonable man we are looking for—what then? What is known of their histories shows well enough that none of them was produced by the kind of tools that would be used by the kind of men who produce atom bombs. They were not produced by scientific breeding nor by arranged environments, nor by psychiatry, nor even by any familiar educational process. Their careers are standing contradictions to all such conven-

tional methods. Their deeds and teachings were apparently the result of certain principles in which they believed and by which they lived. Anyone can find out what those principles were, and without spending any two billion dollars.

"I wish you all success in your project, but must express some doubt as to the efficiency of your basic tool—the tool of all that money. I think you should rather look around for some people who will work on the project without money. If I should happen to be right about who have been the most reasonable men in history, then that two billion dollars may represent, not the tool for solving the human equation, but the problem itself."

THE SCIENTIFIC SPIRIT

(Continued)

change, hoping to make our understanding of evolution or transformation of the species more rational than ever, instead of the reverse.

But look at the matter from the point of view of the man in the street. His idea of a rational process is a process in which the relationship between cause and effect is plain and understandable. He has been taught to regard expressions like "Natural Selection" and "Survival of the Fittest" as descriptions of rational processes. As a believer in Evolution, these ideas give him a sense of psychological security; he feels that nature is orderly and that evolutionary effect follows from evolutionary cause, more or less as Darwin explained it.

Now, he is asked by Dr. Goldschmidt to believe that Darwin gave only pseudo-explanations for organic change. He is told that the Darwinian theory fails to account for the *origin* of species. Natural Selection may accomplish minor modifications, but to originate a species requires a virtual miracle of mutation. "The change from species to species," says Dr. Goldschmidt, "is not a change involving more and more atomistic changes, but a complete change of the primary pattern or reaction system into a new one. . . . One might call this different type of genetic change a systemic mutation."

We want, here, to establish a second general conclusion—the idea that science, as represented by Dr. Goldschmidt, has taken us back, psychologically speaking, to the age of miracles, but without God to perform them. The new miracles are called "systemic mutations." What causes such mutations? Nobody knows. Mutations, big or little, still belong to the mysteries of science. X-rays, as H. J. Müller has shown, may bring on mutations, but these artificially stimulated changes generally do more harm than good to the organism. The radiations from the explosions of atomic bombs are also thought to cause mutations.

Some years ago, Prof. Oliver L. Reiser formulated a new theory of evolution—called Cosmecology—in which he produced evidence to show that cosmic rays may be an important agency for causing mutations. Balloon tests have revealed that in the stratosphere, more than thirteen miles high, "the mutation rate among fruit flies is accelerated to five times its pace at sea level." Prof. Reiser suggests that when intense sun-spot activity re-

duces the protection of the ionosphere, more cosmic rays get through the earth's atmosphere "to make direct hits on chromosomes." And, as sun-spot phenomena are cyclical, they would provide a periodicity in the causes of organic change through sudden mutations. In Prof. Reiser's words:

The direct hits which reach the chromosomes induce the biological changes which are ultimately the origin of new species, and thus evolution is speeded up. Following this there must be a raising of the curtain to its former "normal" level [with the cessation of the sun-spots, the ionosphere resumes its character of a protective blanket against cosmic rays], and organic nature loafs along again until there is a repetition of the process. (*Journal of Heredity*, November, 1937.)

This, of course, is only a theory, but there are at least a few facts to back it up. It is a theory, however, which reaches out into the cosmos for the effective causation of events on earth, in a manner not so very different from the systems of the medieval astrologers. The causes are "out there," veiled from the common man, accessible only to cosmic-ray experts and cooperating geneticists.

We make no pretense, of course, of determining whether or not such theories are the "right" ones. Here, we are trying to justify the generalization that the progress of science is making the life of the ordinary man an increasingly irrational affair. We have other evidence for this idea.

Take for examples a number of fairly recent scientific developments or discoveries—not their precise scientific meaning, but their psychological impact. First came the Vitamins. For the average man, the vitamin craze meant that health comes in a little box you get at the drug store. Then there was all the talk about hormones. Hormone extracts will fix up sex aberrations, in some cases, and get your glands to working right. Then came the sulfa drugs and penicillin. Then glutamic acid, which increases "intelligence." There were shock treatments, insulin, metrazol and electrical, for schizophrenics, and brain surgery for other mental disorders. And now all the new medical wonders promised us by the enthusiasts of atomic fission.

The world is full of miracles, in short. We don't mean to suggest that there is not solid scientific research and fact behind some or all of these discoveries, or that the necessary qualifications of original enthusiasm have been lacking. You can find statements to the effect that vitamin pills, while often beneficial, are not much good to a man who is well fed on a balanced diet. Sulfa drugs must be used with care—sometimes their blood-destroying quality will make them disturb your personality as well as raise bodily resistance to infection. Penicillin has to be properly administered—if you take much of it, it loses its effect. The shock treatment doesn't always work, and some psychiatrists think that people shocked back to sanity might have recovered anyhow. Brain surgery will stop psychopathic worries, but it also cuts out the higher mental faculties, according to medical reports. And glutamic acid doesn't always help rats to find their way out of mazes—so maybe it isn't such a wonderful "food" after all.

If you look carefully, you can nearly always find a sober version of what at first seem to be scientific miracles, but this has very little to do with the general mood created by the pot-of-gold psychology of present-day research. *Some* day science will discover a specific for the common cold; *some* day, the mystery of cancer will be solved; *some* day we'll be able to manufacture geniuses at will, when we learn how to irradiate the genes (or the chromosomes) in just the right way to eradicate stupidity. Instead of searching for the Golden Fleece or the Holy Grail or the Fountain of Youth, we are sacrificing millions of rats, mice, guinea pigs and rhesus monkeys in order to develop the Perfect Serum. We don't worry about Divine Grace any more, but about whether we have the proper glandular secretions.

And now we have Heterochromatin, courtesy of Dr. Richard Goldschmidt, which can make an ordinary insect over into a monster that is male on one side and female on the other, or grow a leg where a wing should be.

The techniques of such science may be "rational," in the sense that each little step of research has a meaning all its own, based upon previous observations and carefully worked up from hypothesis to theory to verification. But what about the "larger meaning"? What about the basic spirit of science which meant so much to Lyell and Darwin? What would men like Lyell and Darwin, with their strong moral sense, be doing if they were alive today?

They would, we think, start looking around for a way to restore to the great enterprise of human life a sense of individual competence and philosophic self-reliance. They would not, we think, care very much about all the ceremonial magic of modern technology. They would see, we think, what it is doing to human beings, psychologically, instead of marvelling at what it is supposed to do for them, materially and physically, now and tomorrow.

They would, in short, be trying to serve human needs—to work out general concepts of meaning and purpose for human life. Of course, we can't prove that that is what they would do; this is just our opinion of what their motivations were—the motivations, we might add, of practically every worthwhile man or woman who has ever lived.

Theories come and go, like "facts" and "proofs." It is folly to deny or ignore any fact or proof, but the real question is, How do you use a theory, a fact or a proof in your daily life? What human excellence will it further? Does this knowledge make a man stronger, braver, wiser and kinder? This question, we think, lies at the heart of all real science, all real religion, all real truth.

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